

TITLE OF THE INVENTION  
FORM PROCESSING DEVICE,  
AND FORM PROCESSING METHOD AND PROGRAM

5

FIELD OF THE INVENTION

The present invention relates to processing  
technology for overlaying each data item described in a  
field data file onto a predetermined field in a form  
10 (memory area in a program for receiving data of the  
field data file).

BACKGROUND OF THE INVENTION

Traditionally, a form processing program has  
15 existed, which overlays each data item described in a  
field data file onto a predetermined field in a form to  
create a form. In order to expand such a form  
processing program to allow handling of file-type data  
such as a bitmap file, the applicants consider to  
20 specify an external file (a file which can be specified  
with a pathname indicating a target location described  
in the field data file, among files stored in a local  
drive or a network drive) by describing, in a field  
data file, the pathname indicating a target location to  
25 which the bitmap file is stored. For example,  
description such as IMAGE1=c:\data\image.bmp is  
provided in the field data file.

In the above described method, however, it is necessary that a field data file and external files, which are file-type data, described therein are on a local drive of a computer on which a form processing  
5 program is operating or a network drive accessible to the computer (hereinafter collectively referred to as a local drive), and accordingly, it is impossible to handle files located on an Internet/intranet server such as a Web server increasing in number nowadays.

10

#### SUMMARY OF THE INVENTION

The present invention is intended to solve the above problem. The object of the invention is to provide a form processing method, a form processing  
15 device and a program for executing form processing that are capable of overlaying data in an external file located on an Internet/intranet server onto a predetermined field in a form.

In order to achieve the above object, the form  
20 processing method according to the present invention is constituted as follows: it is

a form processing method for reading in a field data file storing data to be overlaid onto a defined field in a form, and overlaying data of the field data  
25 file onto a field in the form, the form processing method comprising:

a determination step of determining, when the data of the field data file is description specifying an external file, whether the description of the data is in a URL format;

5 an overlaying step of downloading the external file from a network server in compliance with Internet protocols and overlaying data of the downloaded external file onto the field in the form when the description is determined to be in a URL format at the  
10 determination step.

Other features and advantages of the present invention will be apparent from the following descriptions taken in conjunction with the accompanying drawings, in which like reference characters designate  
15 the same or similar parts throughout the figures thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated  
20 in and constitute a part of the specification, illustrate embodiments of the invention and, together with the descriptions, serve to explain the principle of the invention.

FIG. 1 is a block diagram showing a hardware  
25 configuration of a form processing device according to an embodiment of the present invention;

FIG. 2 is a flowchart showing a flow of data processing by a form processing method according to an embodiment of the present invention;

FIG. 3 is a flowchart showing a flow of data processing by a form processing method according to the present invention;

FIG. 4 is a flowchart showing a flow of data processing by a form processing method according to the present invention;

FIG. 5 is a flowchart showing a flow of data processing by a form processing method according to the present invention;

FIG. 6 is a flowchart showing a flow of data processing by a form processing method according to the present invention;

FIG. 7 shows a configuration of a form processing program according to the present invention;

FIG. 8 shows a memory map in a condition that a form processing program according to the present invention is executable;

FIGS. 9A and 9B show an example of a field data file for which a form processing program according to the present invention performs form processing, and an example of a form obtained after the form processing;

FIG. 10 shows an example of a cache table generated by a form processing program according to the present invention; and

FIG. 11 shows an example of a network system provided with a form processing device according to the present invention.

5            DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described in detail in accordance with the accompanying drawings.

[First Embodiment]

10           Embodiments of the present invention are now described below with reference to drawings. The terms used in the description below are defined as follows. A "form" means a file having a frame, fixed graphics, characters, etc. and allowing data to be overlaid onto  
15   predetermined fields included therein. A "field data file" means a file in which data to be overlaid onto the predetermined fields in the form is divided into data items and stored. A "field" is a basic unit of a form used when data is overlaid onto the form. A "data  
20   item" means each of elements composing data in the field data file. A "file-type data" means data stored as a file (such as image data stored as a bitmap file). A "form processing program" refers to a program for overlaying data from the field data file onto the  
25   defined fields in the form.

FIG. 1 is a block diagram showing a system configuration of a form processing device according to

a first embodiment of the present invention. FIG. 11 is a block diagram of a network including the form processing device (a network in which the form processing device is connected to a web server etc. via the Internet). FIGS 2 to 6 show a flowchart showing operation of the form processing method according to the first embodiment.

In FIG. 1, reference numeral 1 denotes a central processing unit, 2 denotes a storage device such as RAM, 3 denotes a display device such as CRT, 4 denotes a keyboard, 5 denotes a mouse, 6 denotes an external auxiliary storage, 7 denotes a printing device and 8 denotes a network connection device. The external auxiliary storage 6 suggests that a program and the like are provided from a storage medium to a computer. The following can be used as the storage medium: ROM, floppy© disk, CD-ROM, hard disk, memory card, magneto-optical disk, etc. FIG. 7 shows a configuration of a form processing program stored in the storage medium.

As shown in FIG. 11, a form processing device 1101 is connected to Web servers (Web server 1 (1103) and Web server 2 (1104)) and a FTP server 1105 via a network (such as the Internet) and can access files stored in Internet servers.

FIG. 8 shows a memory map in a condition that a form processing program 803, form information 804 and field definition information 805, cache setting 806,

and cache table 807 are stored in the storage device 2 and the program is executable. The form information is layout information for fixed graphics and characters of a form such as a frame.

5       The field definition information is information such as location, size and character attributes of each field onto which data of a field data file is overlaid and the type of the data to be overlaid. The cache setting sets a cache flag indicating whether to cache a  
10 file downloaded from an Internet/intranet server (collectively referred to as a network server) in conformity to the Internet protocols into a disk in a local drive of a client, a cache folder name, capacity limit, etc. The cache table is a list of combinations  
15 of a cache file name, the original URL address and a time stamp.

FIG. 10 shows an example of a cache table. Cache files are stored in a folder with a cache folder name set in the cache setting, and any cache file name may  
20 be used only if it is unique in the cache folder. A character string composed of randomly generated eight-digit hexadecimal figures followed by the extension of an original file is used herein as a cache file name.

The time stamp is the date of the original file  
25 shown when the cache file is created. If there is any file newer than this at the original URL address, a new cache file must be created.

The embodiment is an example where a form processing program operating on a client downloads a field data file located on a Web server and an external file, which is file-type data, described in the field data file into a local drive and overlays them onto a form, and the process is performed in a procedure as shown in FIG. 2.

First, a field data file stored in a Web server or a FTP server is downloaded onto a work memory 808 of a storage device 2 (step S201). The field data file is generated on a Web server or a FTP server by derivation of a variety of data from a database triggered by a user operation in a form processing program operating on a client or a system event. Files are generally downloaded from a Web server or a FTP server via asynchronous data transfer.

FIGS. 9A and 9B show a description example for a field data file (FIG. 9A), and forms for which overlaying process by a form processing program has been completed (FIG. 9B). The line "PICTURE=http://www.server.com/taro.jpg" overlays a JPEG file specified by the form of "label name=file name" onto a field having a label name "PICTURE" in the form. In form processing programs, data of a field data file created on a Web server is usually not used by a client many times but is regarded to be discarded when the process is completed or not to be left on a



local drive as a cache file because of security problems. Accordingly, in this example, the field data file is not stored as a cache file in a local drive.

It is then determined whether the field data file  
5 has been downloaded successfully (step S202). If not, error handling is performed (step S203), and the entire process ends. If the field data file has been downloaded successfully, then it is determined whether the size is zero (step S204). If the size is zero, the  
10 entire process ends. If the size is larger than zero, then an item of data is read in from the field data file (step S205). Though a line from the "Label name=" to the end of line is an item of data in the field data file shown in FIG. 9A, a portion from the beginning of  
15 line or a comma to the end of line or a comma is an item of data in the case of a comma-delimited CSV file.

Then, it is determined whether the item of data read in is a file-type data (S206). This determination  
20 is performed based on field definition information stored in the storage device 2 in advance. In the case of the first line of the field data file shown in FIG. 9A, the label name of the field in the form onto which this data is overlaid is "NAME", so that a field with a  
25 label name "NAME" is searched from the field definition information stored in the storage device 2 to determine the data type.

If the data item is file-type data, an external file is read in based on the pathname shown in the field data file (step S207). As described later, the content of the external file is stored on the work  
5 memory 808 of the storage device 2 and its memory handle is stored in a variable "file\_data" on the work memory 808 of the storage device 2 by this processing.

In case of any error caused during the processing, a NULL handle is stored in the variable "file\_data".  
10 The data stored in the memory handle pointed to by the variable "file\_data" is then overlaid onto a file in the form (step S208).

If the data item is not a file-type data, the existing data overlaying processing suitable for the  
15 data type is performed (step S209). Then, it is determined whether the next data item exists in the field data file (step S210). If it exists, the process returns to step S205 and continues processing for it. All the data items have been overlaid, the process ends.

20 The processing of reading in an external file, which is file-type data (step S207) is performed in a procedure as shown in FIG. 3. It is determined whether the pathname described in the field data file indicates the external file to be on an Internet/intranet server  
25 (step S301). If the pathname is a URL beginning with http:// or ftp://, the external file is determined to be on an Internet/intranet server. If the external

file is not on an Internet/intranet server, it is read in from a local drive (step S302).

In the file reading-in processing, the content of the external file is stored in the work memory of the storage device 2, and its memory handle is stored in the variable "file\_data" on the work memory of storage device 2. In case of any error caused during the processing, a NULL handle is stored in the variable "file\_data". If the pathname indicates the external file to be on an Internet/intranet server at step 301, then it is set whether to download the external file from the address (step S303).

As a result of the processing, "1" is stored in the variable "flag\_download" of the work memory of the storage device 2 if the external file is determined to be downloaded, and "0" is stored if it is determined not to be downloaded. By determining the value (step S304), the external file is downloaded from the URL address of the pathname if the value is "1" (S305).

In the downloading processing, the content of the external file is stored on the work memory of the storage device 2, and its memory handle is stored in the variable "file\_data" on the work memory of the storage device 2. In case of any error caused in the processing, a NULL handle is stored in the variable "file\_data". Then it is determined whether the external file has been downloaded successfully (step

S306). If it has been downloaded successfully, the downloaded external file is stored in a cache file (step S307). If the download has failed, the process ends. If the "flag\_download" is "0" at step S304, a  
5 cache file is read in (step S308).

The download flag setting processing (step S303) is performed in a procedure as shown in FIG. 4. First, it is determined whether the flag in the cache setting of the storage device 2 is "ON" (step S401). If it is  
10 "ON", the URL address of the file-type data currently processed is searched in the cache table (FIG. 10) of the storage device 2 to check if it is registered therewith (step S402). It is then determined whether it has been found (step S403). If it already exists,  
15 the time stamp information of the external file of the URL address is read in and compared with the time stamp of the cache file to determine whether the time stamp of the cache file is older than that of the external file of the URL address (Step S404). If it is not  
20 older, "0" is set in a variable "DL" on the work memory of the storage device 2 (step S405). Otherwise, "1" is set in the DL (step S406). The variable "DL" indicates whether to download the file of the URL address.

The cache file storing processing (step S307) is  
25 performed in a procedure as shown in FIG. 5. First, it is determined whether the flag in the cache setting of the storage device 2 is "ON" (step S501). If it is

"ON", the URL address of the file-type data currently processed is searched in the cache table of the storage device 2 to check if it is registered therewith (step S502). It is then determined whether it has been found  
5 (step S503).

If it is found in the cache table, it means the external file of the URL address has been cached. If it is found, the external file with the cache file name of the entry is deleted from the cache folder (step  
10 S504), and the entry is also deleted from the cache table (step S505).

Then it is determined whether the capacity limit in the cache setting of the storage device 2 is larger than the content of the memory handle stored in the  
15 variable "file\_data" (file size of the external file) on the work memory of the storage device 2 (step S506). If the capacity limit in the cache setting is smaller than the content of the memory handle, the content cannot be cached and consequently the process ends. If  
20 the capacity limit is larger, it is then determined whether the remaining capacity of the cache folder (that is, the capacity limit minus the current folder size) is larger than the content of the memory handle stored in the variable "file\_data" (step S507).

25 If the remaining capacity (free space) of the cache folder is smaller, a cache file of the entry with the oldest time stamp in the cache table of the storage

device 2 is deleted (step S508), and the entry is also deleted from the cache table (step S509). The process then returns to step S507, and deletes older cache files until the content of the memory handle stored in the variable "file\_data" can be stored in a cache file.

If the remaining capacity of the cache folder is larger than the content of the memory handle stored in the variable "file\_data" at step S507, a cache file name which is not used for other existing cache files is generated (step S510), and a cache file with the content of the memory handle stored in the variable "file\_data" written thereto is created in the cache folder with the file name (step S511). It is then determined whether the cache file has been created successfully (step S512). If it has been generated successfully, a new entry showing a set of the created cache name, the original URL address and a time stamp is created and added to the cache table (FIG. 10) (step S513).

The cache file reading-in processing (step S308) is performed in a procedure as shown in FIG. 6. First, a cache file name associated with the URL address of the file-type data currently processed is obtained from the cache table of the storage device 2 (step S601). Since this processing is performed only when the URL address of the file-type data currently processed is found in the cache table of the storage device 2 in the

processing at step S303, the cache name is surely  
obtained at step S601. Then, the external file with  
the obtained cache file name is read in (step S602).  
In the cache file reading-in processing, the content of  
5 the external file is stored on the work memory of the  
storage device 2, and its memory handle is stored in  
the variable "file\_data" on the work memory of the  
storage device 2. In case of any error caused during  
the process, a NULL handle is stored in the variable  
10 "file\_data".

[Second Embodiment]

Though the field data file is on an  
Internet/intranet server in the embodiment described  
above, it is also possible to handle a file on an  
15 Internet/intranet server, shown as a URL address in a  
field data file, even if the field data file is on a  
local disk or a file server.

[Other Embodiments]

The present invention can be applied to a system  
20 configured by multiple pieces of equipment (for example,  
host computer, interface equipment, reader, and  
printer) or to a device consisting of a single piece of  
equipment (for example, copying machine, and facsimile  
machine).

25 It will be apparent that the object of the present  
invention can be achieved by providing a system or a  
device with a storage medium, to which program codes of

a software implementing the functions of the embodiments are recorded, so that the computer (or CPU or MPU) of the system or the device reads and executes the program codes stored in the recording medium.

5           In this case, the program codes themselves, which are read out from the recording medium, implement the functions of the above embodiments, and the recording medium storing the program codes constitutes the present invention.

10           As the storage medium for providing the program codes, the following can be used: floppy© disk, hard disk, optical disk, magneto-optical disk, CD-ROM, CD-R, magnetic tape, non-volatile memory card, ROM, etc.

          It will be apparent that the embodiments of the  
15   present invention include not only a case where a computer executes the program codes read out to implement the functions of the embodiments but also a case where the OS (operating system) operating on the computer executes a part or all of the actual  
20   processings based on the directions by the program codes to implement the functions of the embodiments.

          Furthermore, it will be apparent that the embodiments of the present invention include a case where the program codes read out from the storage  
25   medium are written to memory provided in a function extension board inserted into the computer or a function extension unit connected to the computer, and



then the CPU provided in the function extension board or function extension unit executes a part or all of the actual processings based on the directions by the program codes to implement the functions of the  
5   embodiments.

As described above, according to the present invention, it is possible to overlay data in an external file located on an Internet/intranet server onto a predetermined field in a form.

10       As many apparently widely different embodiments of the present invention can be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the  
15   claims.